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(54) **SONAR TRANSDUCER WITH TUNING PLATE AND TUNING FLUID**

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(58) **Field of Search** 367/152, 166, 367/171, 188; 310/328, 337

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(57) **ABSTRACT**

A method for maximizing the radiated power of a transducer, such as a sonar transducer, includes providing a transducer system comprising a transducer operating at a frequency f and having a radiating face, a tuning fluid having a density ρ_1 and a speed of sound c_1, a tuning plate having a density ρ_p and a thickness t, and an external fluid having a density ρ_2 and a speed of sound c_2; and tuning the transducer to have a maximum specific acoustic resistance at the radiating face in accordance with the equation:

$$\left[\frac{(2\pi f \rho_p t)^2}{\rho_2 c_2 \rho_1 c_1} + \frac{\rho_1 c_1}{\rho_2 c_2}\right]\rho_1 c_1.$$

The present invention also relates to changing the resonance frequency of a transducer including providing a transducer system with an operating frequency f, the tuning plate spaced from the transducer face by a distance s, and the tuning fluid between the transducer face and the tuning plate and changing the resonance frequency in accordance with the equation

$$\rho_1 c_1 \cot\left(2\pi f \frac{s}{c_1}\right).$$

17 Claims, 1 Drawing Sheet